# Stacks on Demand Plugin for JIRA

## INTRODUCTION

Stacks on Demand is a JIRA add-on that will allow all permitted JIRA users to dynamically build the necessary test boxes such instance types, billing type, branch or etc. for a given work period. After configuring the launch profile and CloudFormation template, add the Stacks on Demand gadget to your JIRA dashboard to manage starting or stopping AWS instances.

### The Backend Service

The backend service is constant and responds to frontend API requests. It also has a timer to check AWS instances to update the frontend status as well as terminate any instances that are exceeding their allotted execution time.

This service depends on the following disk files:

<table>
<tr><th>File name</th><th>Description</th></tr>
<tr><td>spotstack_startup.cfg</td><td>This file contains the basic startup information and can be manually edited.<br>It can contain setting such as:
<table>
<tr><th>Setting</th><th>Description</th></tr>
<tr><td>loglevel (normal, debug)</td><td>Normal – include service start/stop messages and any SetInstance call summaries.<br>Debug – includes Normal plus all sent and received AWS call information.</td></tr>
<tr><td>port</td><td>Jira service port to listen</td></tr>
<tr><td>awssettingspath</td><td>This is the path to the spotstack_aws.cfg file containing sensitive information.</td></tr>
<tr><td>stacksettingspath</td><td>This is the path to the spotstack_settings.cfg file. The service can read or write to the file.<br>Frontend administrators can change this rule file for stack definitions. It should be included in the server’s regular data backup.</td></tr>
<tr><td>awsrefreshseconds</td><td>This is the frequency to update the cached aws instance list, status and the frequency in which the rules will be evaluated to determine when instances should be terminated.</td></tr>
</table></td></tr>
</table>

| | |
|---|---|
| **spotstack.log** | This file contains logging information. |
| **spotstack_stacks.cfg** | This file contains stack definitions and/or rules and can be manually edited via the service by a frontend administrator. Each record will contain a definition for a stack and will require different entries specific to managing of the stack.<br>The add-on supports multiple EC2 instances across different aws accounts. |
| **spotstack_aws.cfg** | This file contains the AWS credentials required to manage the instances. Each set has an identifier and each stack definition will specify to use one of these credential sets. The file can contain multiple aws credentials to handle different stacks in different accounts. |

When an instance is started, its stack rule identifier is stored in a tag. This implies that the service can obtain the list of instances, examine their tag and determine which of them are managed by the add-on. After that, these instances can be stopped at any time.

> **Note:** The add-on does not presist this information or attempt to keep local information sync'd with AWS - AWS is the sole keeper of information regarding running instances.

The service will poll AWS based on a timer setting in **spotstack_startup.cfg** to determine which instances are running. If the allotted times have expired, the service will automatically stop that instance.

> **Info:** At service startup it will begin to poll AWS for the instance list and immediately clean up any instances beyond their allotted execution time.

# REQUIREMENTS

The Stacks on Demand add-on requires JIRA 6.1.x and higher.

An AWS account from Amazon Web Services is required to utilize the features of the add-on.

# ROLES AND PERMISSIONS

Generally, **JIRA Administrator** *global permissions* are required to administer and install any add-on including **Stacks On Demand Plugin for JIRA**.

The IAM role is a set of permissions which is usually applied to the user or to an EC2 instance. This field is optional.

## Minimum Security Settings

The super-administrator (DevOps) can provide the target account with the role with IAM policy containing the following actions to fulfill:

| **EC2-specific actions** |
|---|
| RebootInstances |
| RunInstances |
| StartInstances |
| StopInstances |
| TerminateInstances |
| DescribeInstances |
| DescribeTags |
| DescribeSubnets |
| DescribeSecurityGroups |
| CreateTags |
| DescribeImages |
| PassRole |

| **CF-specific actions** | (+EC2 should be included also, as the add-on currently use both CF and EC2 services to manage CF-stack resources) |
|---|---|
| ListStacks | |
| DescribeStackResources | |
| CreateStack | |
| DeleteStack | |
| DescribeStacks | |
| ListStackResources | |
| DescribeStackResource | |

### JIRA Group Permissions

Each stack configuration has a required field indicating which JIRA groups can start the stack type.

Non-administrator users will only see running stacks that they have started. Only viewing or editing stacks are the available options in the add-on settings for these users.

A new field specifies which JIRA groups are allowed to start any stack and view all stacks that are running or recently terminated. This setting supports multiple JIRA groups. The default value is **jira-administrators**.

# CORE TERMS

All core terms involves part of the add-on configuration and are required to control the Stacks.

The administrator should be aware of the core terms, in the event of working with the add-on:

| Core term | Description |
|---|---|
| **StackProfile** | Aggregates set of **LaunchProfile** elements in one-to-many relation. This is, however, not applicable to **StackProfile** relating to Stack for CloudFormation service. |
| **LaunchProfile** | There is a strong one-to-one relation of LaunchProfile elements, especially with its two subtypes – **EC2 LaunchProfile** and **CF LaunchProfile**.<br>**EC2** – The LaunchProfile for Elastic Compute Cloud (EC2) defines only one instance or spot request.<br>**CF** – The CloudFormation LaunProfile defines a template with provided parameters and will be managed by CloudFormation to build and start the Stack.<br>The aim of the StackProfile is to commonly start the Stack or set of EC2 instance resources. |
| **AwsAccount** | Defines the AWS account at Amazon Web Service. |
| **CloudFormationLaunchProfile** | Represents the CloudFormation template definition plus provided parameters set for the stack. The parameters can be declared via the template body or using a URL which point to the file template.<br>CF LaunchProfile and CF StackTemplate configuration must be set in order for the stacks to start. |
| **CloudFormationStackTemplate** | The CloudFormationStackTemplate is a text representation for building your managed AWS resources. Multiple resources can also be specified in the template.<br>Define an EC2 instance, instance type, AMI ID, block device mappings and EC2 key pair name in this template. Save it as a .json, .template or .txt file as long as it complies with the JSON standard.<br>Point the URL setting to this file or paste the contents of this file into the provided Template box in (**Stacks on Demand** > **AWS CloudFormation Stack Template** > **Add AWS CloudFormation Stack Template**).<br>For further information, see AWS CloudFormation Stack Templates. |

# CLOUD FORMATION

CloudFormation is a user-defined template which contains script to create an EC2 instance with IAM Role.

The sample CF templates are available at:

https://github.com/AdvancedProcessDesigns/StacksOnDemand

| Template name | Description |
|---|---|
| **demo0-cf-template-ec2instance.json** | Cloud Formation Template, which runs empty EC2 instance |
| **demo0-cf-template-ec2instance.readme** | Provides instructions on how to setup the Stacks on Demand add-on with *demo0-cf-template-ec2instance.json* |
| **demo1-cf-template-helloworld.json** | Cloud Formation Template, which launch EC2 instance from publicHelloWorld AIM |
| **demo1-cf-template-helloworld.readme** | Provides instructions on how to setup the Stacks on Demand add-on with *demo1-cf-template-helloworld.json* |
| **demo2-cf-template-helloworldwithcolor.json** | Cloud Formation Template, which launch EC2 instance from publicHelloWorldWithParams AIM |
| **demo2-cf-template-helloworldwithcolor.readme** | Provides instructions on how to setup the Stacks on Demand add-on with *demo2-cf-template-helloworldwithcolor.json* |

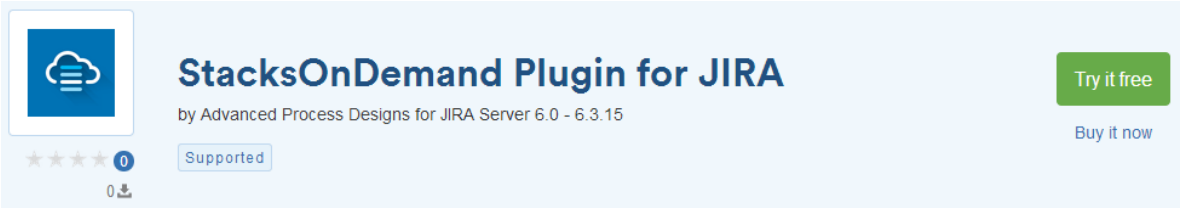
For managing CloudFormation Templates, see section CF Stack Templates.

# INSTALLATION

You must have the **JIRA System Administrators** *global permission* to install add-ons.

## Installation via Atlassian Marketplace

1. Go to the **Stacks on Demand Plugin for JIRA** Atlassian Marketplace page.

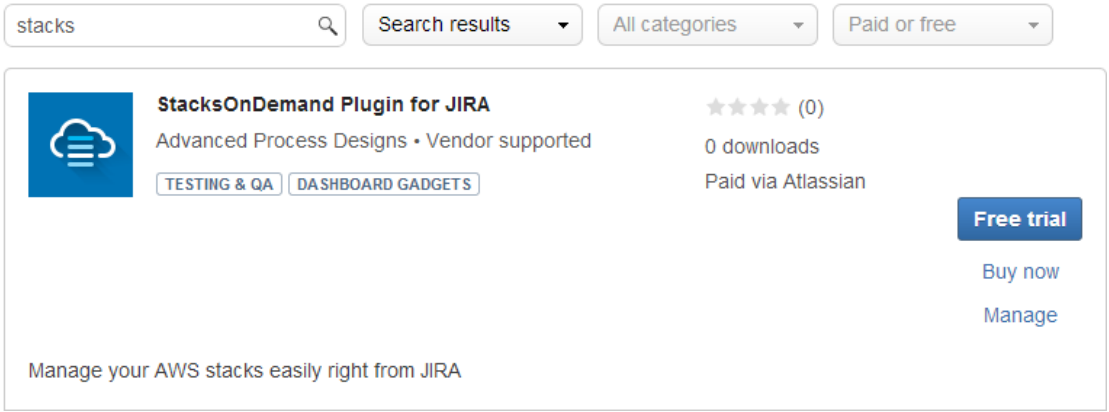



2. Buy or evaluate the add-on with a free 30 day trial.

3. Login to your JIRA account, if required, to continue installation of the add-on. For free trial licenses, the license key is automatically configured into the add-on configuration. For purchased license keys, see *Setup License Key*.

## Installation via JIRA Universal Plugin Manager

1. In JIRA, go to  ***Administration*** > ***Add-ons***. The ***Find New Add-ons*** page is displayed.




2. Type '**stacks**' in the search box then hit **Enter** to search the Marketplace.

3. Buy the add-on or start the free trial for 30 days.

4. Login to your JIRA account, if required, to continue installation of the add-on. For free trial licenses, the license key is automatically configured into the add-on configuration. For purchased license keys, see *Setup License Key*.

### Manual Installation

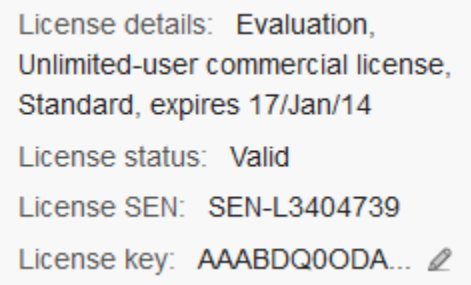
To manually update the Git add-on, the user must have the **JIRA System Administrators** *global permission*. If the user does not have this permission, the upload add-on and other system administration functions will not be available.

Use manual install if you have a specific version of **Stacks on Demand Plugin for JIRA** downloaded from the marketplace or sent by some other file sharing method:

1. In JIRA, go to  ***Administration*** > ***Add-ons*** > **Manage Add-ons.**
2. Click  Upload Add-on and navigate to the jar file that you already have.
3. Click **Upload**. Restart your application for changes to take effect.
4. Buy the add-on or start the free trial for 30 days.
5. Login to your JIRA account, if required, to continue installation of the add-on. For free trial licenses, the license key is automatically configured into the add-on configuration. For purchased license keys, see *Setup License Key*.

# SETUP LICENSE KEY

Go to the **Stacks on Demand Plugin for JIRA** add-on configuration.




Click the **Edit** icon to enter/change the **License key**.

If the ***License key*** field is blank, you need to obtain a license for the Stacks on Demand add-on. Click **Buy now** or **Free trial**. Login to your Atlassian account, when prompted, to acquire the license based on your selected license mode.

# CONFIGURING STACKS ON DEMAND

Go to **Administration** > **Add-ons** > **Stacks on Demand.**

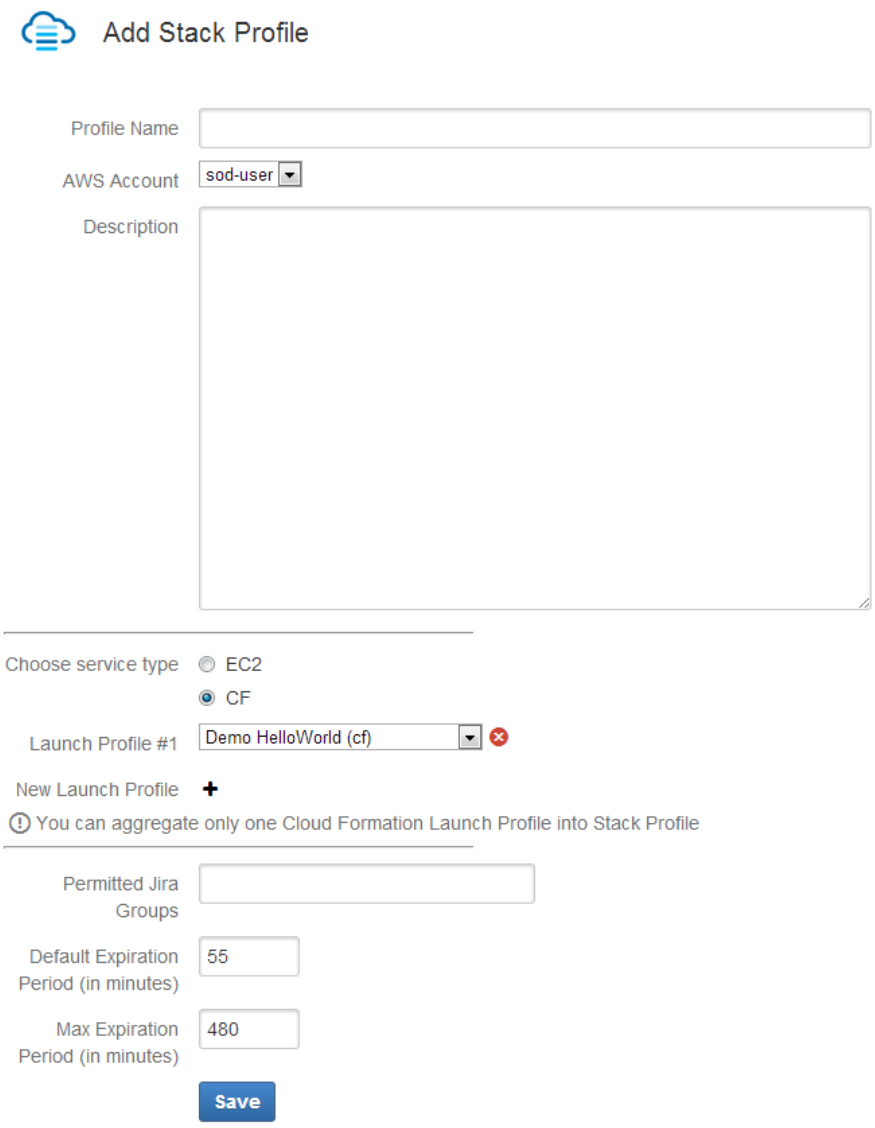
Only JIRA Administrators are allowed to configure these settings.

## STACK CONFIGURATION

This page allows administrators to create a new stack profile. A launch profile and a template must have already been configured to proceed. See related sections for more information about these topics.

### Adding a Stack Profile

To configure a new stack profile, click **Add Stack Profile**.



Utilize the following options to populate the fields as required:

| Field | Description |
|---|---|
| **Profile Name** | Enter a descriptive name. |
| **AWS Account** | Select an AWS account from the dropdown list. |
| **Description** | Enter description of this stack profile on the provided box. |
| **Choose service type** | Choose a service type for this stack profile. (EC2 or CF) |
| **Launch Profile** | Select desired launch profile from the list.<br>Select EC2 from ***service type*** then add multiple LaunchProfile items for this instance.<br>Select CF (CloudFormation) from ***service type*** then add just one CF Launch Profile for this instance. |
| **Permitted JIRA Groups** | Assign users who can see and use this stack profile. The input field is type or click-sensitive to provide the user a selection of valid JIRA group. |
| **Default Expiration Period (in minutes),**<br>**Max Expiration Period (in minutes)** | Enter a numerical value for this field as required or leave the default value as is. |

Click **Save** to save the changes and add this new stack profile to the list.

To discard the changes, press the back button on your browser to return to the **Stack Configuration** page.

### Editing a Stack Profile

Click the  icon on the **Actions** *column* to edit the selected stack profile. You will be presented with the same screen as adding a stack profile but with details filled out. Edit as required then click **Save** to save the changes.

### Removing a Stack Profile

Click the  icon on the **Actions** *column* to delete the selected stack profile from the list.

## LOG VIEWER

Log processes of running stacks are displayed in this page.

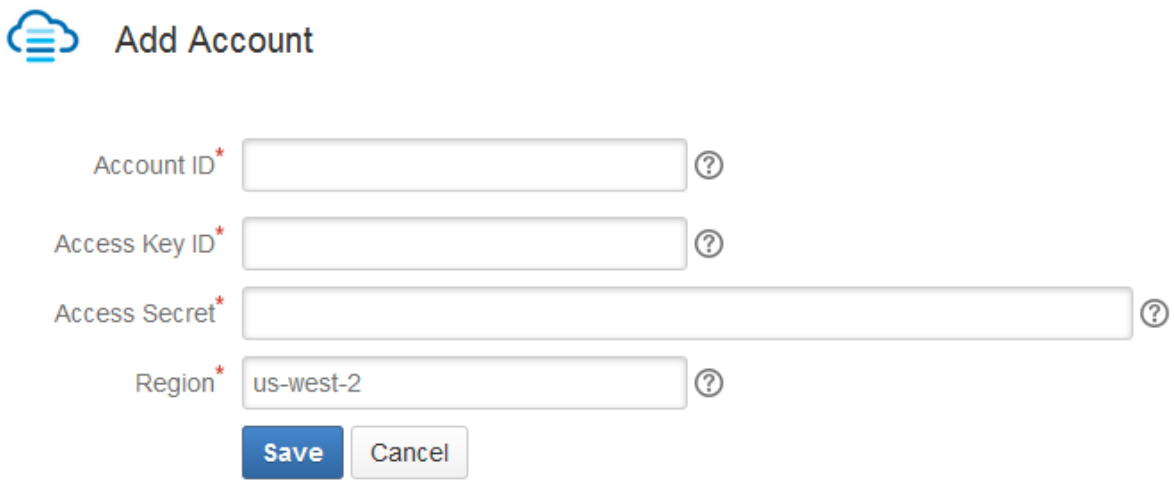
# CREDENTIALS

On this page, administrators can manage configured AWS accounts. A list of configured AWS accounts is displayed.

## Adding a New Credential

To add a new AWS account, click **Add AWS account**.

The **Add Account** screen is displayed:




Enter required information. All fields must be populated.

| Field | Description |
|---|---|
| **Account ID** | This is the AWS Account ID. Typically, this is the login ID. |
| **Access Key ID** | This is the AWS Access Key ID. It's a unique identifier associated with a secret access key. |
| **Access Key Secret** | This is the Access Key Secret string for this account. You can generate secret access keys, individual IAM users, and temporary sessions thru your AWS account. |
| **Region** | Displays a named set of AWS resource in the same geographical area. |
| **Actions** | - Edits the AWS account.<br>- Removes AWS account. |

Click also on the icon to see additional information for that field.

Click **Save** to save the changes.

### Editing a Credential

Click the icon on the **Actions** *column* to make changes to the selected credential.

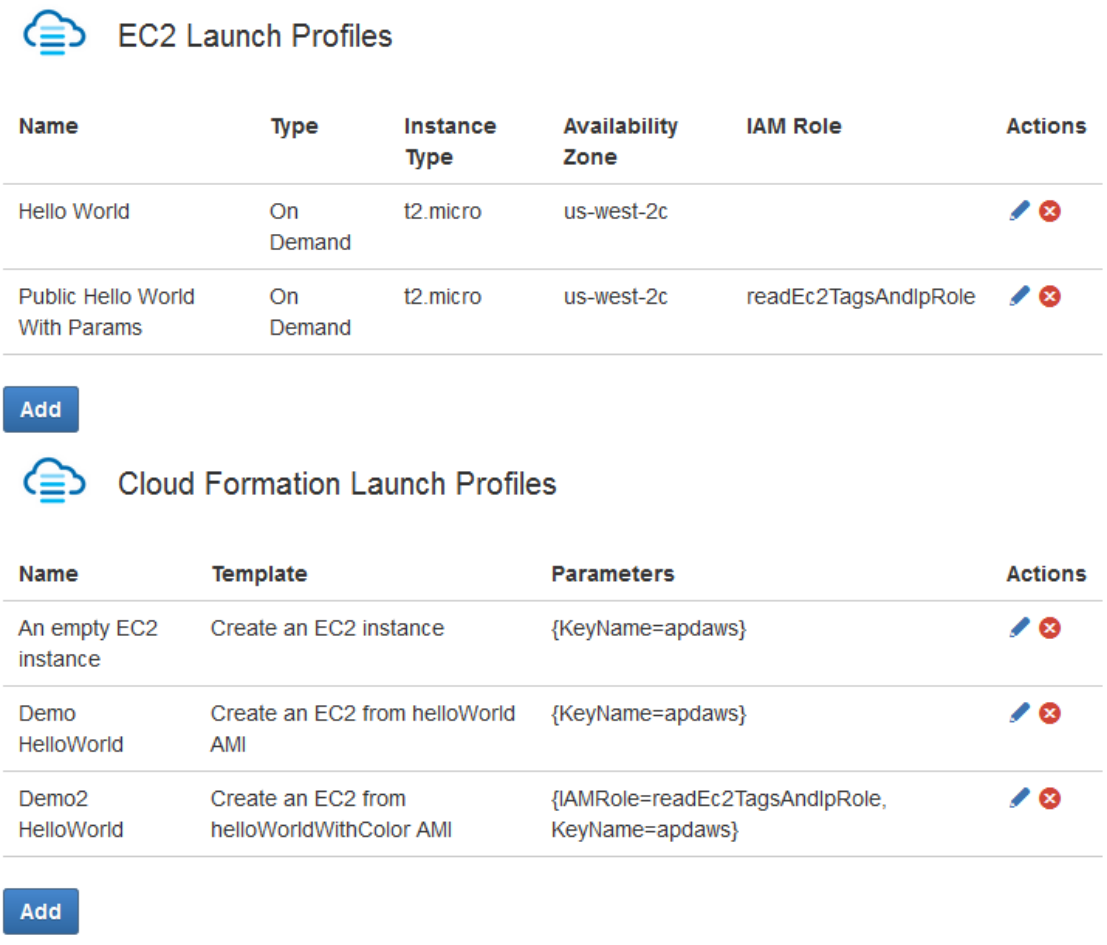
You will be presented with the screen similar to adding a credential but with details filled out. Edit as required then click **Save** to accept the changes.

### Removing a Credential

Click the icon on the **Actions** *column* to delete the selected credential.

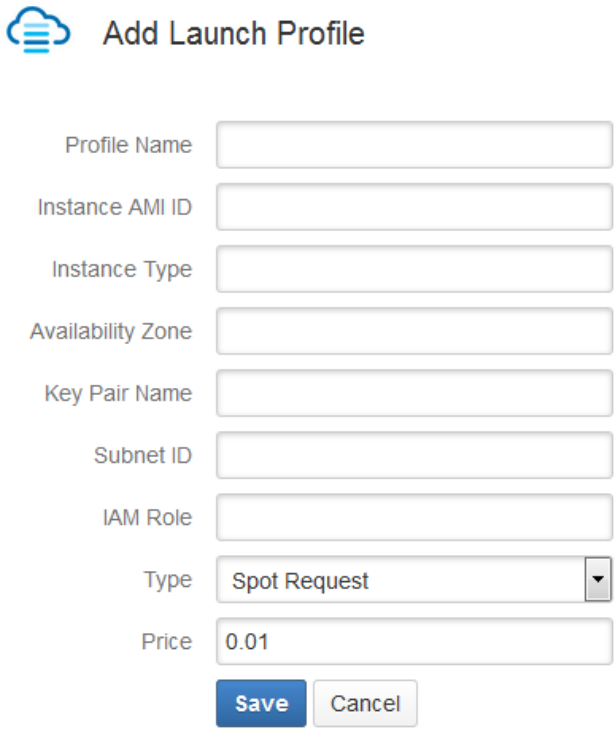
## LAUNCH PROFILES

On this page, administrators can manage configured Launch Profiles. A list of configured launch profiles is displayed for each section, EC2 and Cloud Formation Launch Profiles.



## Adding a New EC2 Launch Profile

To add a new launch profile, click **Add** on the EC2 Launch Profile section. The following screen is displayed:




Enter required information by utilizing the options as follows:

| Option | Description |
|---|---|
| **Profile Name** | Name of the launch profile. |
| **Instance AMI ID** | Stack type. |
| **Instance Type** | Type of stack instance. |
| **Availability Zone** | Refers to the region the stack is located. |
| **Key Pair Name** | Enter key pair name for this launch profile. |
| **Subnet ID** | Enter subnet ID. |
| **IAM Role** | IAM permission role of the launch profile. |
| **Type** | Select Spot Request or On-Demand.<br>Spot Request and On-Demand instances are purchasing options of AWS. For detailed information, see Amazon EC2 Instance Purchasing Options. |
| **Price** | Price of the stack service per hour. |

Click **Save** to save the changes.

## Editing the EC2 Launch Profile

Click the icon on the **Actions** *column* to make changes to the selected EC2 launch profile.

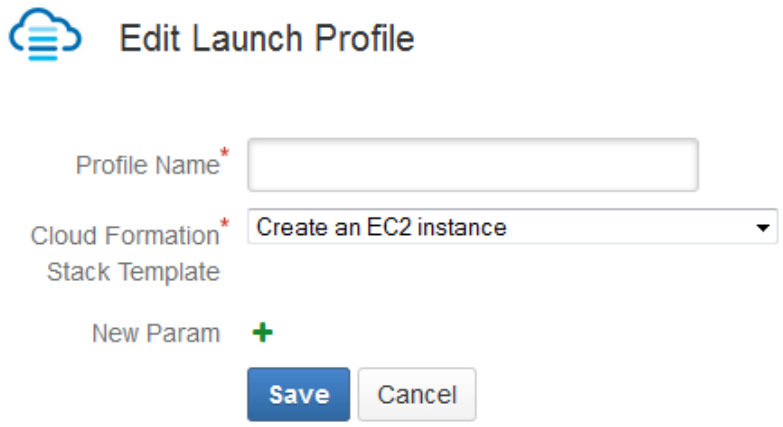
You will be presented with the screen similar to adding an EC2 launch profile but with details filled out. Edit as required then click **Save** to accept the changes.

## Removing an EC2 Launch Profile

Click the icon on the **Actions** *column* to delete the selected credential.

## Adding a CloudFormation Launch Profile

To add a new launch profile, click **Add** on the CloudFormation Launch Profile section. The following screen is displayed:




For this page, utilize the options below as follows:

| Option | Description |
|---|---|
| **Profile Name** | Enter a descriptive name for this CloudFormation launch profile. |
| **Cloud Formation Stack Template** | Select available templates derived from the **CF Stack Templates** tab. |
| **New Param** | Click + to add a new parameter. Several parameters can be added.<br>Enter a string value for ***ParamName*** and declare a ***paramValue*** or a variable declaration. (e.g. ***paramName*** = KeyName, ***paramValue*** = your Key Pair Name)<br>For more information, see EC2 Key Pairs.<br>Click to remove the selected parameter group. |

Click **Save** to save the changes.

### Editing the CloudFormation Launch Profile

Click the icon on the **Actions** *column* to make changes to the selected CloudFormation launch profile.

You will be presented with the screen similar to adding a CloudFormation launch profile but with details filled out. Edit as required then click **Save** to accept the changes.

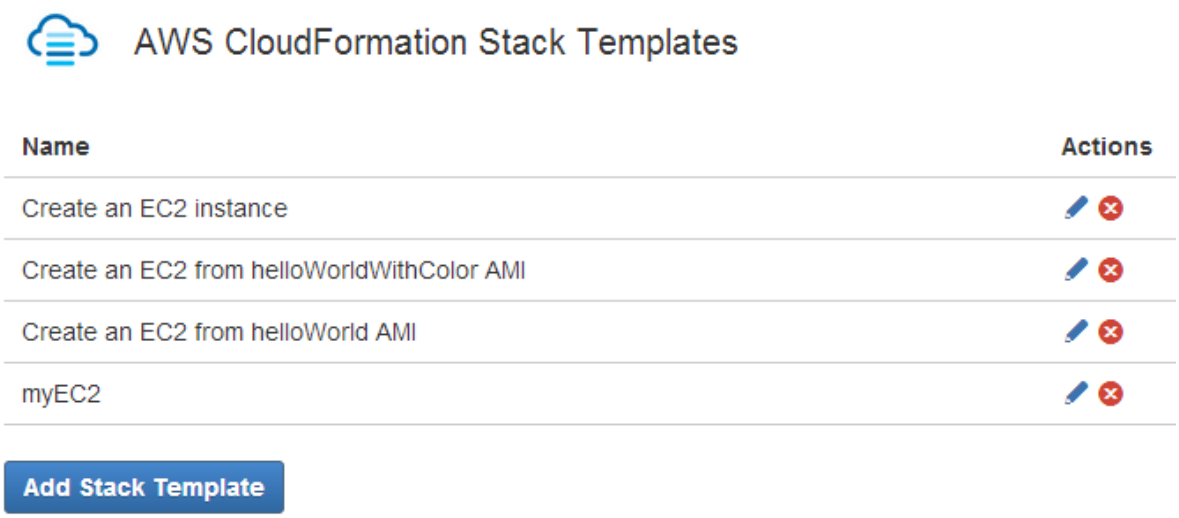
### Removing an CloudFormation Launch Profile

Click the icon on the **Actions** *column* to delete the selected CF launch profile.

## AWS CLOUDFORMATION

Manage CloudFormation Stack templates on this page. A list of configured templates is displayed.

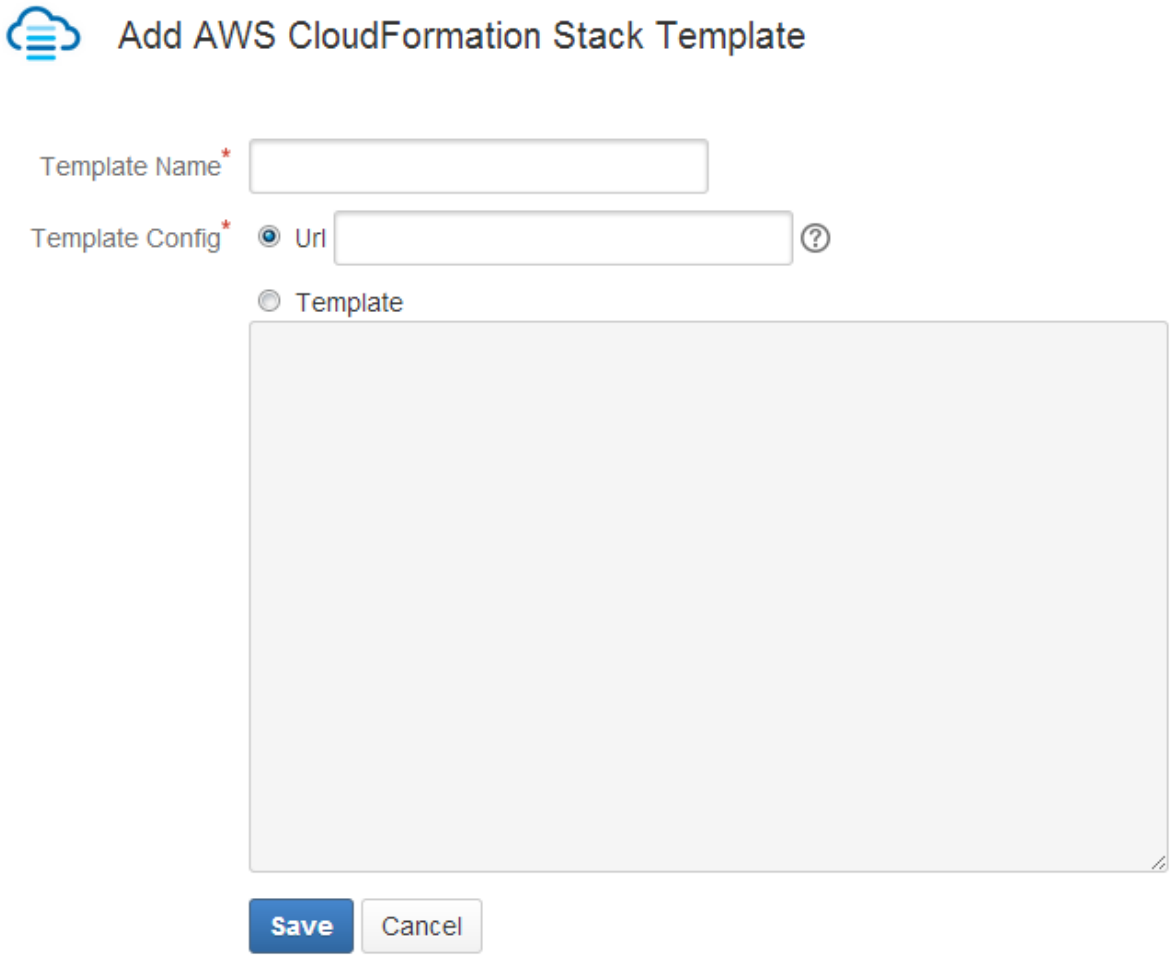
For more information on CloudFormation Templates, see AWS CloudFormation Templates.



## Adding a CloudFormation Stack Template

Add a new CF stack template by clicking **Add Stack Template**.

The following screen is displayed:




Enter a unique **Template Name**.

For **Template Config**, enter the required valid **URL** pointing an existing template in an Amazon S3 bucket located in the same region as the stack. This template must have minimum read permissions. Maximum size of the template is 460,800 bytes. Select **Template**, if[ you want to type or paste your template configuration in the box provided.

Click **Save** to save the changes.

### Editing a CloudFormation Stack Template

Click the icon on the **Actions** *column* to make changes to the selected CloudFormation stack template.

You will be presented with the screen similar to adding a CloudFormation stack template but with details filled out. Edit as required then click **Save** to accept the changes.

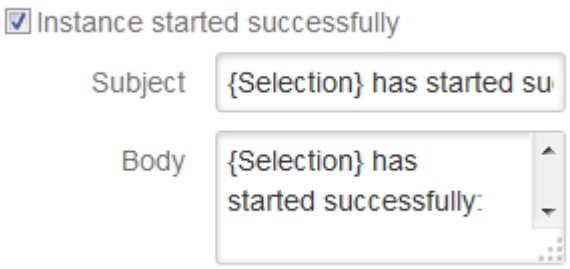
### Removing a CloudFormation Stack Template

Click the icon on the **Actions** *column* to delete the selected CF stack template.

## EMAIL NOTIFICATIONS

Determine how instances are doing by sending administrators selected log activities to their email address.

Users that have started a stack will receive selected alerts thru their email address. All options are selected by default.




Configure **Subject** and **Body** *fields* for each selected option as required.

An email template in a gray background block is displayed below the page for reference on body message writing.

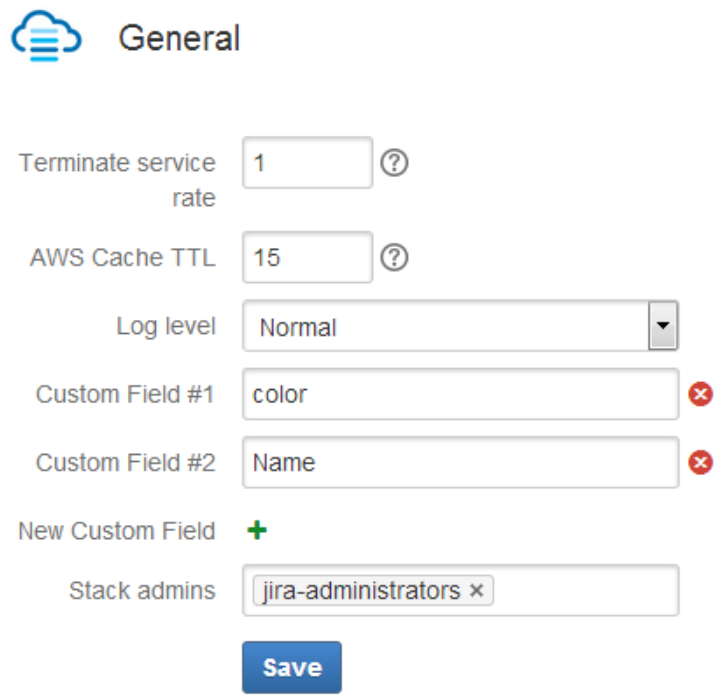
The **IP**, **Status**, **ExpireTime**, **StartedTime**, **StartedBy**, **Selection** and **TimeRemaining** are reserved words for the state of the particular stack. These are placeholders enclosed in curly braces "{ }" and actual values will appear on the recipient's email.

All other placeholders will be recognized by Stack on Demand add-on as a custom field for Stack. The add-on will attempt to place the proper values such as **{color}**, **{Branch}**, **{Description}** and etc.

Click **Save** to save the changes.

# GENERAL

The **General** tab contains stack settings that can only be accessed by JIRA administrators.




| Option | Description |
|---|---|
| **Terminate service rate** | States how often expired stacks are checked (in minutes).<br>*0 = never. Default value is 1.* |
| **AWS Cache TTL** | States how long stacks could stay in the EC2 response cache (in seconds).<br>*A value of 0 disables the cache. Default value is 15 seconds.* |
| **Log level** | Defines the mode of the log level – **Normal** or **Debug**. Debug mode enables email logging containing debug information which is displayed in the **Log Viewer** screen. **Normal** mode does not enable email logging. |
| **Custom Field [n]** | Click + to add a new custom field. Several custom fields can be added so that they are recognized by the add-on as placeholders in the **Email** > ***message body***.<br>Enter a string value for ***ParamName*** and declare a ***paramValue*** or a variable declaration.<br>Click ⊗ to remove the selected custom field. |
| **Stack admins** | Assign a JIRA user group to administer configured stacks. Several groups can be assigned to this field.<br>Click on this field and select the required user or group from the list.<br>Click **x** on an existing group to exclude that group from this field. |

Click **Save** to save the changes. Press the back button on your browser to cancel the changes.

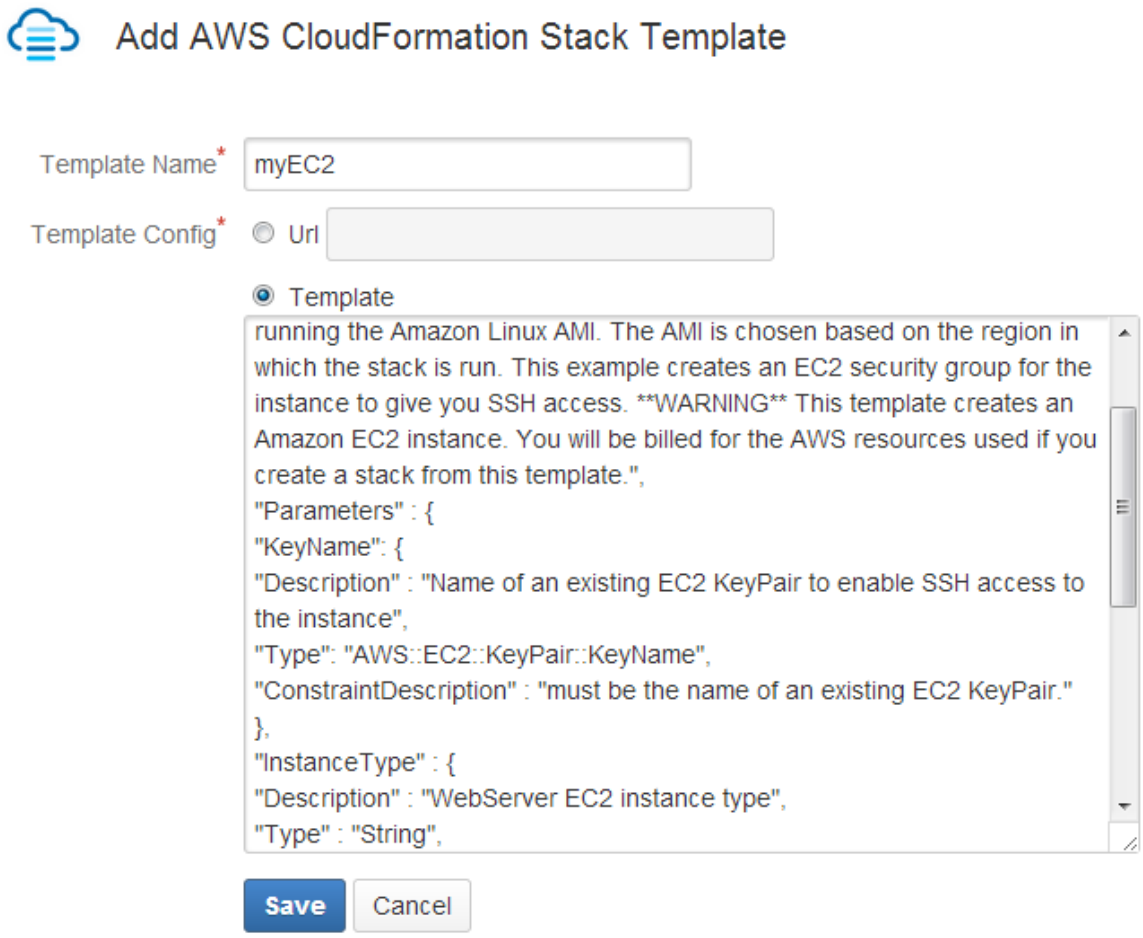
# SETUP A CLOUDFORMATION TEMPLATE USING EC2 INSTANCE

Create an EC2 instance running the Linux AMI. The AMI is chosen based on the region in which the stack is run. This method creates an EC2 security group for the instance providing SSH access.

Be warned that this template will create an EC2 instance. if you create a stack using this template, you will be billed for the AWS resources used.

1. To create a CF stack template, go to **Administration** > **Add-ons** > Stacks on Demand > **CF Stack Templates.**

   The **Cloud Formation Stack Templates** screen is displayed. Click **Add Stack Template**.




   Enter a descriptive **Template Name** for this new template**.**

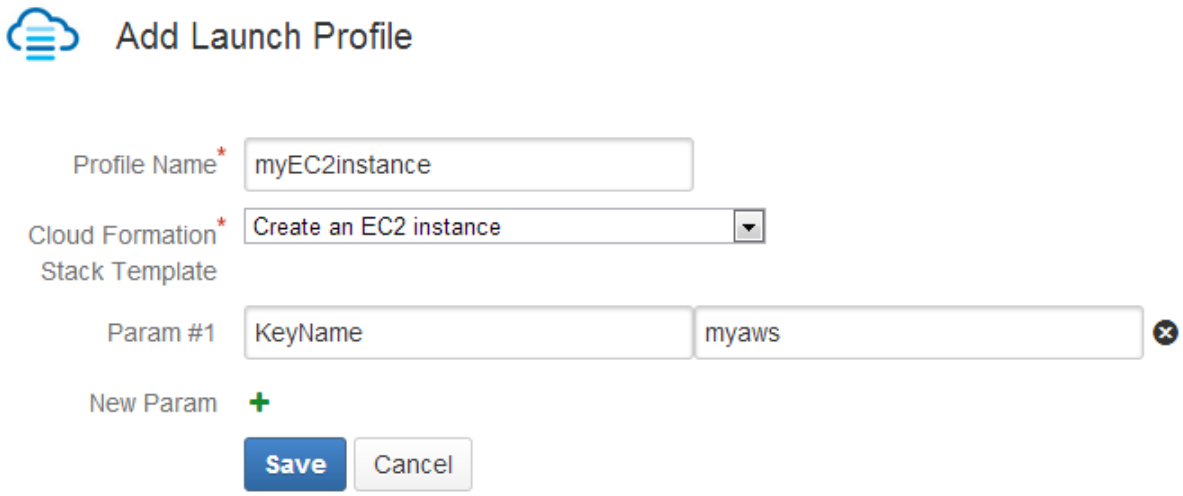
   Select **Body** as ***Template Config***. Use the contents of the [demo0-cf-template-ec2instance.json]() (Github) as reference and paste it on the box provided. Edit parameters as required.

   Click **Save** to save the changes and add this new CF stack template.

2. To create a CF Launch Profile, go to Stacks on Demand > **Launch Profiles.**

   Under **Cloud Formation Launch Profiles**, click **Add**.

   The following screen is displayed:




   Enter a meaningful **Profile Name** as required.

   Select a **Cloud Formation Stack Template** from the dropdown list – e.g. ***Create an EC2 instance***.

   Add a **New Param** by clicking ✚. A new parameter field called **Param #1** is displayed. Enter required parameter declaration and value to the provided fields.

   (Example: *paramName* = KeyName; *paramValue* = your Key Pair Name)

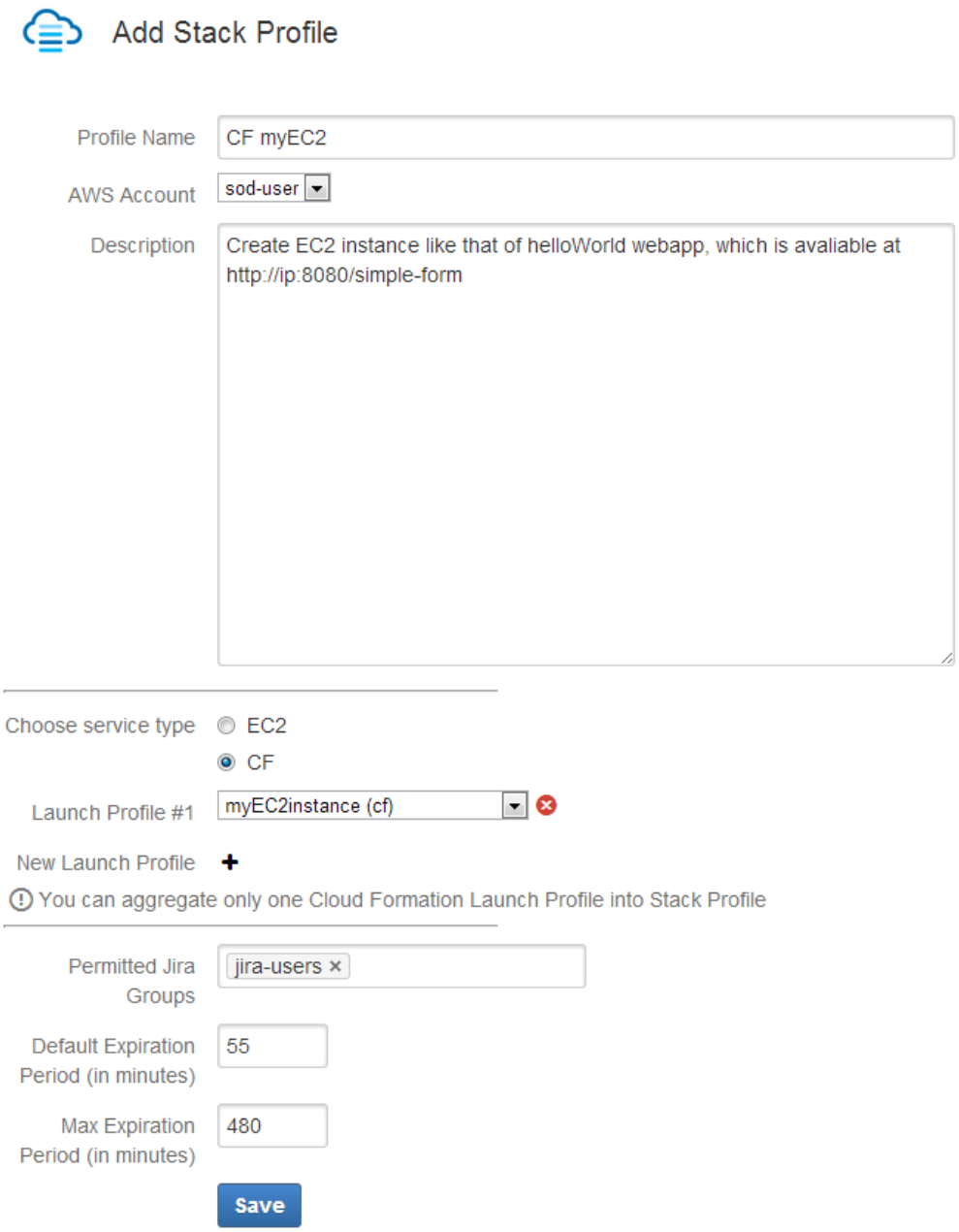
   Add another parameter if required.

   You may add *paramName* = InstanceType, *paramValue* = choose one from *["t1.micro", "t2.micro", "t2.small", "t2.medium", "m1.small", "m1.medium", "m1.large", "m1.xlarge", "m2.xlarge", "m2.2xlarge", "m2.4xlarge", "m3.medium", "m3.large", "m3.xlarge", "m3.2xlarge", "c1.medium", "c1.xlarge", "c3.large", "c3.xlarge", "c3.2xlarge", "c3.4xlarge", "c3.8xlarge", "g2.2xlarge", "r3.large", "r3.xlarge", "r3.2xlarge", "r3.4xlarge", "r3.8xlarge", "i2.xlarge", "i2.2xlarge", "i2.4xlarge", "i2.8xlarge", "hi1.4xlarge", "hs1.8xlarge", "cr1.8xlarge", "cc2.8xlarge", "cg1.4xlarge"]*

   Click **Save** to add this new launch profile to the CF launch profile list.

3. Update Stack Configuration by going to Stacks on Demand > **Stack Configuration.**

   The following screen is displayed:




   Enter a descriptive **Profile Name**.

   Select an **AWS Account** from the dropdown list.

   Enter **Description** of this stack profile on the provided box.

Choose **Service Type** for this stack profile, in this case, **CF**.

Select desired **Launch Profile** from the list.

Assign users in the **Permitted Jira Groups** box. The input field is type or click-sensitive to provide the user a selection of valid JIRA group.

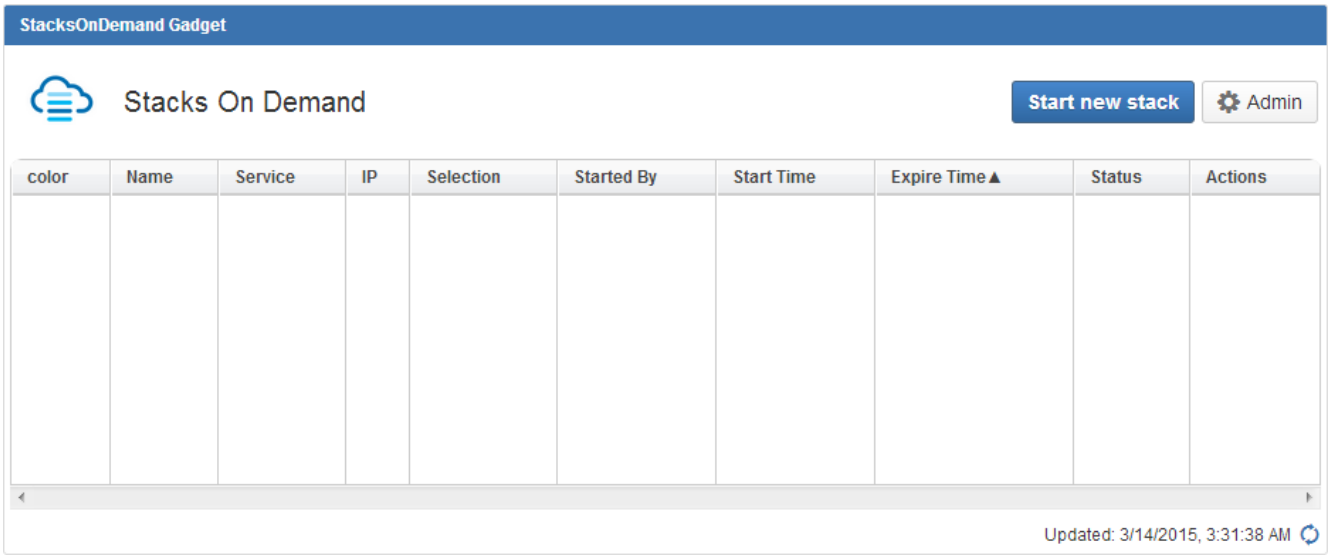
Enter **Default Expiration Period *(in minutes)*** as required or leave the default value as is.

Enter **Max Expiration Period *(in minutes)*** as required or leave the default value as is.

Click **Save** to save the changes and add this new stack profile to the list.

## WORKING WITH THE STACKS ON DEMAND JIRA GADGET

To manage stacks from JIRA, the Stacks on Demand gadget must be place on the user's dashboard.

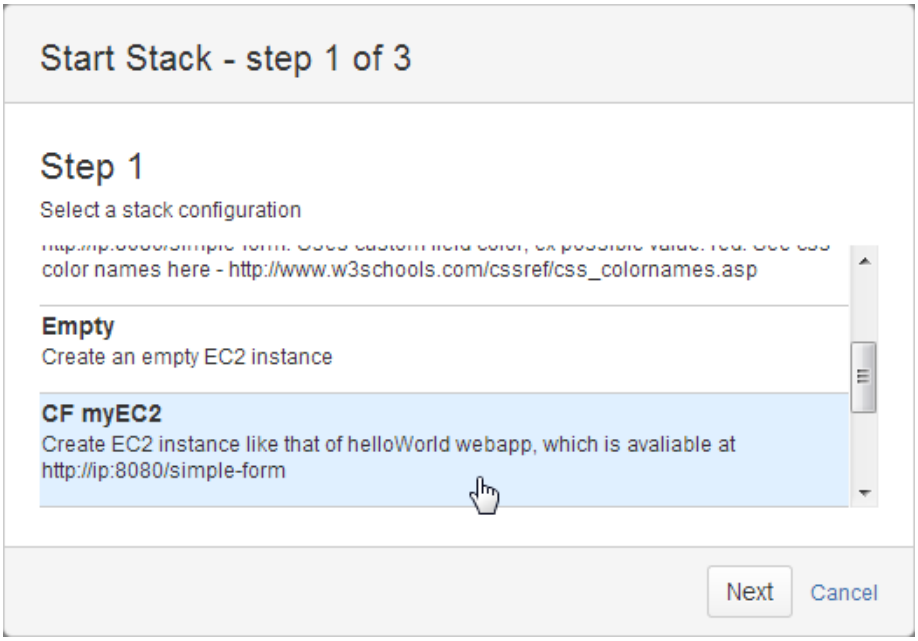



The add-on is divided into two main sections. The top section lets you start new stacks. The bottom section allows you to manage running stacks. Each stack definition defines the JIRA group which can start a specific type of stack.

**Info:** If a user starts a stack, that user will be able to manage that stack. Other users can only see stacks that they have started in the running stacks list. Only stack administrators can manage stacks that were started by other users.

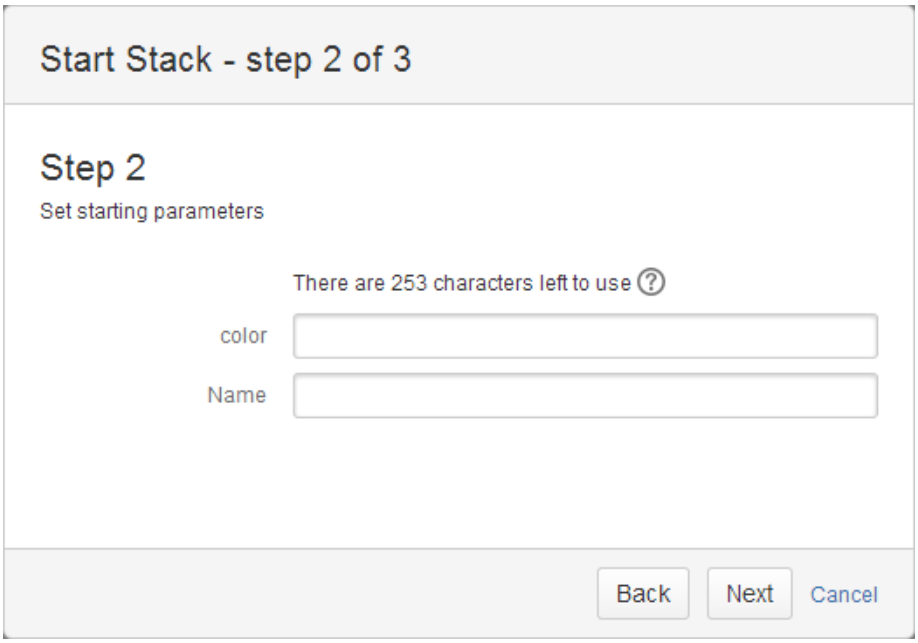
Click **Start new stack**. The Start Stack wizard is displayed.

Select a stack configuration from the list:

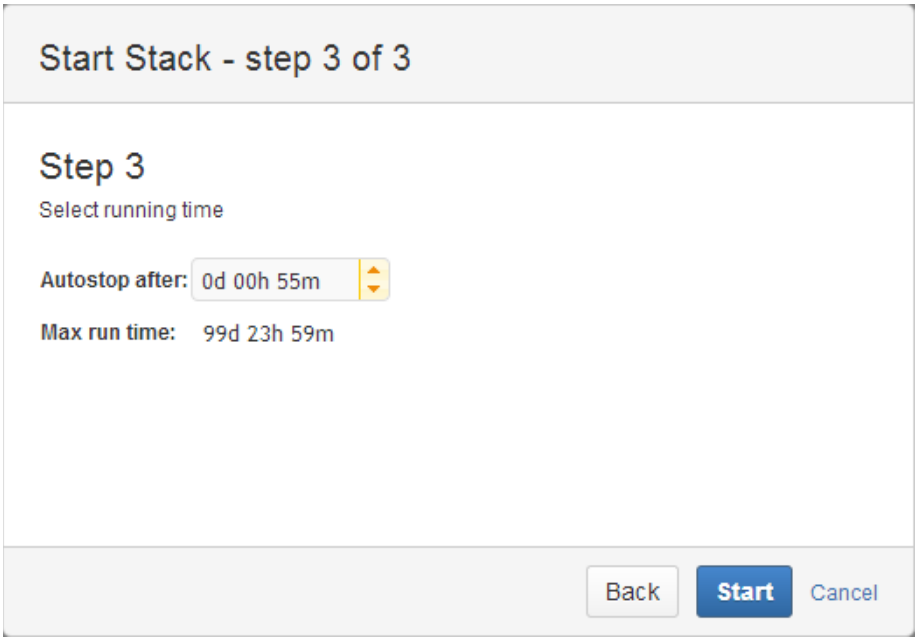



Click **Next**.

In this step, you are prompted with the custom fields declared in the **General** settings of the **Stacks on Demand** add-on.




Set the starting parameters for this dialog. In this case, enter **color** (supports CSS color names) and a descriptive **Name** for this stack. Click **Next**.

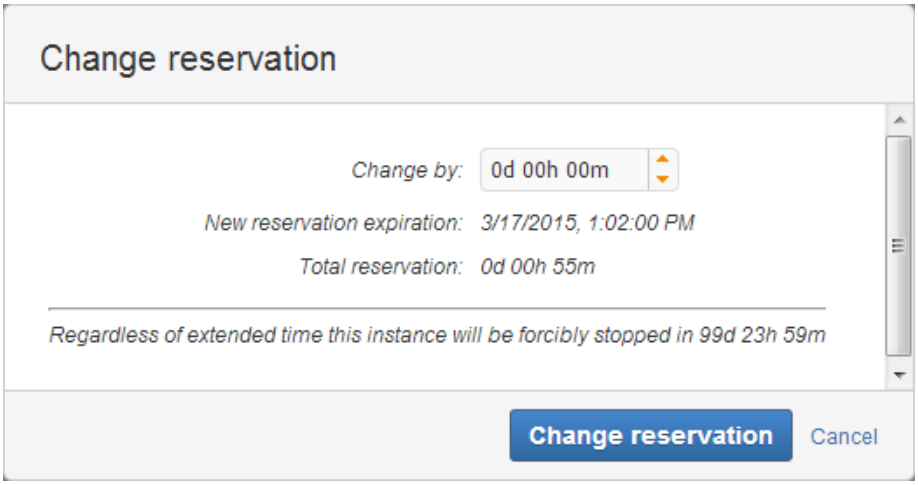



In this dialog, set the **Autostop after** time value as required. Recommended value should be greater than 20 minutes. **Max run time** indicates the maximum run time for stacks allowed by AWS.

Click **Start** to close the wizard and start this stack. The new stack will appear in the running stack list of the **Stacks on Demand** gadget.

## Changing Reservation of the Running Stack

To manage the allotted time for this stack, click  on the **Actions** *column* then select **Change**.




Adjust the **Change by** time to a positive value to increase the reservation time for this running stack. A negative value will decrease the reservation time. The changes are instantly reflected to the displayed **Total reservation** time value. Click **Change reservation** to accept the changes.

## Stopping a Running Stack

To forcefully stop a running stack, click  on the **Actions** *column* then select **Stop stack**. When the stack is stopped, the status will change to **Terminated**.

## Accessing General Settings from the Stacks on Demand JIRA Gadget

To configure the add-on **General** settings, click 

on the **Stacks on Demand** gadget.